ABSTRACT OF THE DISCLOSURE

A system and method for determining the required decoupling capacitors for a power distribution system using an improved capacitor model. In one embodiment, a method for determining the decoupling capacitors for a power distribution system includes creating a model of the power distribution system using circuit simulation software, such as SPICE. The power distribution system model includes a plurality of cells interconnected at predetermined nodes. The method then selects one or more decoupling capacitors for the power distribution system. The decoupling capacitors are represented in the power distribution system model by a capacitor model, which is a mathematical model of an electrical circuit. The electrical circuit upon which the capacitor model is based is a ladder circuit. Following the selecting of the decoupling capacitors, the power distribution system model is update based on the selections, and operation of the power distribution system is then simulated. During the simulation, transfer impedance values are determined for each of the nodes, and compared to target impedance. The method is then repeated until each of the transfer impedance values is at or below the target impedance.